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Molecular packing, piezo- and pyroelectric properties of *tert*-butyl *N*-(*tert*-butoxycarbonyl)-(*S*)-prolinamide

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Chiral organic compounds attract considerable attention as a basis for biocompatible and environmental friendly materials. It is known that natural amino acid derivatives are capable of self-organization in solid state [1] and possess piezoelectric [2] and pyroelectric properties [3].

We studied the properties of crystals of *N*-(*tert*-butoxycarbonyl)-(*S*)-prolinamide **1**. Compound **1** was obtained as a result of coupling between *N*-Boc-(*S*)-proline and *tert*-butylamine by the method of mixed anhydrides. The single crystals of **1** were grown by spontaneous crystallization from a water–methanol mixture and by a vapor diffusion technique.

It has been found that compound **1** forms crystals of two types differing in their morphology. X-Ray diffraction analysis (XDA) has shown that the crystals belong to hexagonal (*hex*-**1**, space group $P6_1$) or triclinic syngony (*tc*-**1**, space group *P*1) (Fig. 1). The general motif of molecular packing of *hex*-**1** is a formation of nanotubes oriented along the main crystal axis.

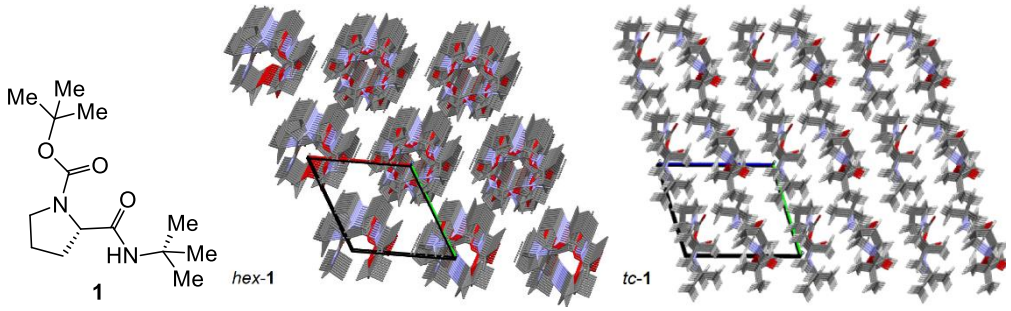

Figure 1. The structural formula and molecular packing of compound **1** according to XDA.

The magnitudes of vertical piezoelectric response of isomorphic crystals *hex*-**1** measured independently by piezoresponse force microscopy and interferometry techniques were in good agreement. The observed piezocoefficients reached 12 pC/N.

The pyroelectric effect of crystals *hex*-**1** was measured.

It has been shown that the phase transition is induced by the IR laser irradiation. The single crystals *hex*-**1** transformed to polymorphic *hex*-**1** / *tc*-**1** conglomerates.

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